**The Disorderly Family**

The Disord family has a long history of many genetic disorders. In some cases a family member even has multiple kinds of these rare genetic disorders. Surprisingly all family members are still alive today! They all put their brains together to create family trees in order to identify who has what disease. The disorders in this family have sometimes been sex-linked. The family seems to have trouble figuring out who is affected with what genetic disorder in generation 2. You must darken each shape following the key below. Can you piece this family tree back together?

Key

Circles are male family members

Squares are female family members

Red shapes are affected family members

White shapes are un-affected family members

Green shapes are carriers of the genetic disorder (heterzygotes)

**Genetic Disorder 1 - Simplmendeloptosis**

Grandpa Jim 1 Grandma Jill 1

Bob 2 Renee 2 Jim Jr. 2 Trudy 2 Mark 2 Nancy 2 Bill 2 Mary 2

Dave 3 Kevin 3 Chris 3 Davis 3 Yazmin 3 Erin 3

Heather 3 Lisa 3 Stephanie 3

Robert 3 John 3 Katie 3

**Genetic Disorder 2 -Trinsolvitis (advanced)**

Grandpa Jim 1 Grandma Jill 1

Bob 2 Renee 2 Jim Jr. 2 Trudy 2 Mark 2 Nancy 2 Bill 2 Mary 2

Dave 3 Kevin 3 Chris 3 Davis 3 Yazmin 3 Erin 3

Heather 3 Lisa 3 Stephanie 3

Robert 3 John 3 Katie 3

**Discussion Questions:**

Is genetic disorder 1 a dominate or recessive disorder? How can you tell?

Recessive. If this was a dominate disorder there would be no carriers of the disease because all carriers would also be affected.

What can you conclude about genetic disorder 2? (Hint: notice how there are no male carriers of this disorder. Could this be due to chance or is there underlying cause?)

One can conclude that genetic disorder number 2 is sex-linked on the X chromosome. One will notice that males cannot inherit the disorder from their father because even though the father may be effected, he passes along his unaffected Y chromosome to his sons.

If Kevin was to marry a completely unaffected female from disorder 1 and 2, and they have 1 boy and 1 girl, what can you conclude about their child’s genetic disorders?

Both the boy and the girl will be carriers (heterozygote recessive) for disorder 1 however, only the girl will be affected by disorder 2.

If Robert was to marry a carrier for both disorders, what can you conclude about the risk their children inheriting both disorders?

Following Punnet square rules of inheritance, you can conclude that there would be a 1 in 4, 25%, chance the child inherits genetic disorder 1. In regards to disorder 2 it gets a little trickier as it depends on whether the child is a boy or a girl. If the child is boy there is a 100% percent chance he will inherit genetic disorder 2 but if it is a girl she will be unaffected. However, there is a 50% chance the girl is a carrier for the disorder.